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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/049,993	04/02/2002	Pawel W. Sleboda	LDOS0230PUSA	2605

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EXAMINER
LAO, LUN S

ART UNIT	PAPER NUMBER
2643	11

DATE MAILED: 05/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/049,993	SLEBODA ET AL.	
	Examiner	Art Unit	
	Lun-See Lao	2643	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 April 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Introduction

1. Claim 1-45 of U.S. application 10/049,993 filed on 04/02/2002 is presented for examination and this communication is responsive to the applicant's election. Claims 1-45 are pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 12 and 24, are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The stiffness between "1E7PA and 4E9PA" (see specification page 7 line 8-9) was not described in the further detail in the specification nor in any of the claim.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Regarding claim 38, the phrase "ect" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1,9-11,13,15-16,18-23,25-38, 40-41, 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Azima (US PAT 6,377,695) in view of Clark (US PAT 5,754,664).

Regarding claim 1, Azima teaches that an audio system for use in a vehicle having a roof, the system comprising:

an acoustically-insulating headliner adapted to be mounted adjacent the roof so as to underlie the roof and shield the roof from view (see fig.3, 4), the headliner having an upper surface (see fig.1) and a sound-radiating, lower surface (see col.5 line 5-col.6 line52);

an array of electromagnetic transducer assemblies supported at the upper surface of the headliner (see fig.1);

However, Azima fails to teach that a source of audio signal; and signal processing circuitry coupled to the assemblies for processing the audio signals to obtain processed audio signals wherein the assemblies convert the processed audio signals into mechanical motion of corresponding zones of the headliner and wherein the headliner is made of a material which is sufficiently stiff and low in density, the headliner radiates

acoustic power into the interior of the vehicle with a frequency range defined by a lower limit of 100 hertz or less and an upper limit of 12 kilohertz or more and the processed audio signals at a low end of the frequency range are matched to the processed audio signals at mid and high ends of the frequency range.

On the other hand, Clark teaches that a source of audio signal (see fig.3, 12); and signal processing circuitry (see fig.9) coupled to the assemblies for processing the audio signals to obtain processed audio signals wherein the assemblies convert the processed audio signals into mechanical motion of corresponding zones (see col.5 line 15-col.6 line 50) of the headliner and wherein the headliner is made of a material which is sufficiently stiff (metal, polymer) and low in density (foam and fabri) , the headliner radiates acoustic power into the interior of the vehicle with a frequency range defined by a lower limit of 100 hertz or less and an upper limit of 12 kilohertz or more and the processed audio signals at a low end of the frequency range are matched to the processed audio signals at mid and high ends of the frequency range (see col.4 line 5-67).

Therefore, it would have obvious to one of ordinary skill in the art the time the invention was made to combine the teaching of Azima and Clark to improved audio output controlling system providing listening pleasure for passengers in the vehicle.

Regarding claims 9-11,13, Clark teaches that the array of electromagnetic transducer assemblies includes a front row of electromagnetic transducer (see fig.1, (18,19,20)) assemblies positioned 5 to 30 inches in front of an expected position of a passenger in the interior of the vehicle and a back row of electromagnetic transducer

(see fig.1, (24,29,25,28)) assemblies positioned behind the expected position of the passenger wherein the signal processing circuitry delays (see fig.9) the audio signals coupled to the back row of electromagnetic transducer assemblies relative to the audio signals coupled to the front row of electromagnetic transducer assemblies (see col.8 line44-col.9 line10); and the array of electromagnetic transducer assemblies are completely supported on the upper surface of the headliner (see col.5 line 1-col.6 line 50); and the system is comprising at least one loudspeaker coupled (see fig.1,26,27) to the signal processing circuitry, and adapted to be placed in the interior of the vehicle in front of an expected position (near front corners) of a passenger and below the headliner; and the system of the electromagnetic transducer assemblies are spaced to the left (see fig.3,(26))and right(27) , front (18,19,20)and rear (28,29) of expected positions of passengers in the interior of the vehicle to create proper audio imaging for the passengers (see col.4 lines 7-67).

Regarding claims 15-16, Clark teaches that the system comprises a low frequency speaker (see fig.4, 28) positioned below the headliner in the interior of the vehicle; and the array has front (see fig.9, (18,19,20)) and rear (24,25,28,29) assemblies and wherein each rear electromagnetic transducer assembly is coupled to processed audio signals delayed in time relative to the processed audio signals coupled to each front electromagnetic transducer assembly (see fig.9).

Regarding claims 18-23, Azima teaches that the system of the electromagnetic

transducer assemblies are supported only on the headliner (see fig.1); and the headliner is self supporting (see fig.1); and the system comprises a semi-compliant attachment mechanism adapted to attach the headliner to the roof along at least a substantial periphery of the roof (see col.3 lines3-55); and a semi-compliant attachment mechanism adapted to attach the headliner to the roof along at least a substantial periphery of the roof and a central portion of the roof (see col.5 line 13-col.6 line 23); and a support structure for reinforcing the headliner (see col.4 line 5-col.5 line20); and the system is comprising framing independent of the headliner to support the assemblies (see col.2 line 15-col.3 line 55).

Regarding claim 25-29, Azima teaches that the stiffness and density of the headliner material is altered around the entire periphery of the headliner to 3 allow for additional excursion of the entire headliner in order to create better low 4 frequency reproduction (< 200 Hz) of the processed audio signals (see col. col.2 line 43-col.3 line 55); and the system is comprising a fabric or other material adhered to the lower surface of the headliner to create a cosmetically acceptable appearance for the system (see col.4 line 13-60); and a fabric or other material adhered to the upper surface of the headliner for routing wires over the headliner in order to keep the wires from vibrating when in contact with a vibrating headliner (see col.2 line 15-col.3 line 55 and fig.4); and is comprising audio signal wires integrated into the headliner (see fig.3); and a material adhered to the headliner to provide additional mass or damping or stiffness thereby minimizing unwanted excess vibration caused by any resonances in the headliner material (see col.4 line 15-col.5 line 20).

Regarding claims 30-34, Azims teaches that the system comprises fiberglass or other suitable material positioned between the headliner and the roof to minimize undesirable acoustical reflections from the roof, to minimize standing waves set up in a cavity created between the headliner and the roof and to prevent the array of electromagnetic transducer assemblies from engaging the roof (see col.6 line 10-col.7 line 15); and a electromagnetic transducer assembly for a local sound zone is located approximately between 5" and 30" in front of an expected ear location for a passenger (see fig.1); and least one of the electromagnetic transducer assemblies is adhered directly to the headliner (see fig.3); and each of electromagnetic transducer assemblies includes a subassembly having vibrational characteristics and adapted to be screwed, snapped, or twisted into position at the upper surface of the headliner, and wherein vibrational characteristics of each of the subassemblies can be tested for performance and quality prior to its installation on the headliner (see col.4 line 5-col.5 line 22); and each of the assemblies includes a base fixedly secured to the headliner and inherently a bayonet-style coupling for removably secured to its corresponding subassembly to its base and wherein each coupling also makes electrical contact between a conductor which is coupled to the circuitry and its corresponding subassembly (see col.4 line 5-col.5 line 20).

Regarding claims 35-38, Clark teaches that the system of the processed audio signals to be delivered to each electromagnetic transducer assembly may be routed to alternate electromagnetic transducer assemblies to achieve different imaging and performance goals, the processed audio signals being monaural, stereo, or multi

channel signals (see fig.9); and an acoustical center channel signal in a multi-channel setup is achieved by sending a processed center channel signal to both left and the right channel electromagnetic transducer assemblies in a row of electromagnetic transducer assemblies and utilizing mechanical mixing of the headliner to move the headliner between the left and right channel electromagnetic transducer assemblies as a center channel speaker (see col.6 line 50-col.7 line 9); and the system is comprising a compliant material positioned between the assemblies and the roof (see col.5 line 15-col.6 line 50); and least one microphone positioned in the interior of the vehicle for intra-cabin and extra cabin communications (cellular, digital, etc) (see col.3 line 49-col.4 line 7).

Regarding claims 40-41 and 45, Clark teaches that the system of the signal processing circuitry utilizes adaptive filtering techniques to perform automatic system equalization (see col.7 line 1-col.8 line 42); and each area in the interior of the vehicle can be separately equalized (see fig.9); and the system has a frequency response shape wherein the signal processing circuitry changes the shape of an equalization curve applied to the audio signals based on the signal level of the audio signals to maintain the frequency response shape relatively constant as the signal level of the audio signals change (see col.8 line 20-col.10, line 20).

8. Claims 2-4,14,17 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Azima (US PAT 6,377,695) as modified by (US PAT 5,754,664)

as applied to claim 1, and further in view of House (US PAT. 5,887,071 hereinafter House).

Regarding claim 2, Azima and Clark differs from claim 2 in not disclosing that the system of the vehicle has a windshield and wherein the array of electromagnetic transducer assemblies includes at least one row of electromagnetic transducer assemblies adjacent the windshield and wherein the at least one row of electromagnetic transducer assemblies are positioned 5 to 30 inches in front of an expected position of a passenger in the interior of the vehicle.

However, House teaches that the system of the vehicle has a windshield and wherein the array of electromagnetic transducer assemblies includes at least one row of electromagnetic transducer assemblies adjacent the windshield (see fig.2 (44,46)) and wherein the at least one row of electromagnetic transducer assemblies are approximately positioned 5 to 30 inches (see fig.2,(24,26)) in front of an expected position of a passenger in the interior of the vehicle (see fig.3).

Therefore, it would have obvious to one of ordinary skill in the art the time the invention was made to combine the teaching of Azima and Clark in to the teaching of House to improved 3D sound system providing listening pleasure for passengers in the vehicle.

Regarding claims 3-4, House discloses that the system includes at least one row of electromagnetic transducer assemblies are positioned approximately 12 to 24 inches in front of the expected position of the passenger (see fig.1); and least one row of electromagnetic transducer assemblies includes at least two electromagnetic transducer

assemblies spaced apart to correspond to left and right ears of the passenger in the expected position of the passenger (fig.2, (24,26)).

Regarding claims 14,17 and 43 House discloses that the system comprises at least one loudspeaker positioned in front of expected positions (see fig.2, (24,26)) of passengers below the headliner but not in doors, kick panels, or under a dash of the vehicle; and the audio signals are processed with head-related transfer functions by the signal processing circuitry (see col2 line 27-col.3 line 26); and the audio signals are processed with trans-aural techniques to widen or narrow an image (see col.2 line 10-col.3 line 25).

9. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Azima (US PAT 6,377,695) as modified by (US PAT 5,754,664) as applied to claim 1, and further in view of Marquiss (US PAT. 4,385,210 hereinafter Marquiss).

Regarding claim 5, Azima and Clark differs from claim 5 in not disclosing that the system of the electromagnetic transducer assemblies includes a magnet for establishing a magnetic field in a gap formed within the assembly, a coil which moves relative to the magnet in response to the processed audio signals, a base fixedly secured to the headliner on the upper surface and electrically connected to the signal processing circuitry and a guide member electrically connected to the coil and removably secured to the base for supporting the coil in the gap and wherein the coils are electrically coupled to the signal processing circuit when the guide members are secured to their corresponding bases.

However, Marquiss teaches that the system of the electromagnetic transducer assemblies includes a magnet for establishing a magnetic field in a gap formed within the assembly, a coil which moves relative to the magnet (see fig.6) in response to the processed audio signals (see col.7 line 13-40), a base fixedly secured to the headliner on the upper surface and electrically connected to the signal processing circuitry (see fig.7) and a guide member (see fig.6, 50) electrically connected to the coil and removably secured to the base for supporting the coil (see fig.5,29) in the gap and wherein the coils are electrically coupled to the signal processing circuit (see fig.7) when the guide members are secured to their corresponding bases.

Therefore, it would have obvious to one of ordinary skill in the art the time the invention was made to combine the teaching of Azima and Clark in to the teaching of Marquiss to provide a thin planar loudspeaker system, which is mounted directly upon and cooperates acoustically with other supportive planar surface.

Regarding claims 6-8, Marquiss teaches that the system of the magnets is a high-energy permanent magnet (see col.6 line 41-col.7 line 25); and the system of the high energy permanent magnets is a rare-earth magnet (see col.6 line41-col.7 line 25); and the system of the assemblies includes a spring element (see col.5 line 61-col.6 line 6) having a resonant frequency below the lower limit of the frequency range when incorporated within its assembly and connected to its corresponding guide member for resiliently supporting its corresponding magnet above the upper surface of the headliner (see col.5 line 40-col.6 line 6).

10. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Azima (US PAT 6,377,695) as modified by (US PAT 5,754,664) as applied to claim 1, and further in view of Watanabe (US PAT. 5,450,057 hereinafter Watanabe).

Regarding claim 39, Azima and Clark differs from claim 39 in not disclosing that the system of the processed audio signals represent global or local vehicle warnings delivered to the entire or local interior sections of the vehicle.

However, Watanabe teaches that the system of the processed audio signals represent global or local vehicle warnings delivered to the entire or local interior sections of the vehicle (see col.1 lines 35-65).

Therefore, it would have obvious to one of ordinary skill in the art the time the invention was made to combine the teaching of Azima and Clark in to the teaching of Watanabe to provide a safety loudspeaker system.

11. Claim 12,24 and 42,44 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Azima (US PAT 6,377,695) as modified by Clark (US PAT 5,754,664) as applied to claim 1, and further in view of Azima (US PAT. 6,332,029 hereinafter Watanabe).

Regarding claims 24,12, Azima (695) and Clark (664) do not teach the headliner material has a flexural modulus between IE7PA and 4E9PA and a density between 100 and 800 kg/m3 and wherein the headliner material may be made from a single material or composites.

However, Azima (029) teaches that the headliner material has inherently a flexural modulus between IE7PA and 4E9PA and a density between 100 and 800 kg/m3 (the panel (2) is made as an expanded polystyrene foam core of typically 100g/m3 density, 8mm thick skinned with hardened aluminum alloy skins of 0.1mm. A soft foam or felt strip, some 3mm thick is fixed to the perimeter to provide a partially compliant mounting when placed in the ceiling frames and also helps to suppress any possible vibration in ceiling framing section.) and wherein the headliner material may be made from a single material or composites (see col.23 line 25-col.26 line 50).

Therefore, it would have obvious to one of ordinary skill in the art the time the invention was made to combine the teaching of Azima (695) and Clark (664) in to the teaching of Azima (029) to provide practical loudspeaker ect design, i.e. using available actual materials and values of their relevant parameters, satisfactory lightweight core materials will generally be of expanded foamed synthetic plastics materials.

Regarding claims 42 and 44 Azima (029) teaches that the headliner (panel elements) has a relatively high coincidence frequency to maximize channel separation, provide accurate imaging and minimize distortion and wherein the coincidence frequency is greater than 12 KHz 9see col.16 line 60-col.19 line 40); and the headliner (Young's modulus) has a structure which is broken at a flexure to minimize transfer of mechanical motion across the flexure (col.25 lines 3-65).

Conclusion

12. The prior art made of record and not relied upon is considered to applicant's disclosure. Parrella (US PAT. 6,181,797) is recited to show other related the vehicular audio system and electromagnetic transducer assembly for use therein.

13. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:(703) 872-9314

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lao,Lun-See whose telephone number is (703) 305-2259 The examiner can normally be reached on Monday-Friday from 8:00 to 6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz, can be reached on (703) 305-4708.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 whose telephone number is (703) 306-0377.

Lao,Lun-See
Patent Examiner
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DUC NGUYEN
PRIMARY EXAMINER